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PATENT ABSTRACTS OF JAPAN

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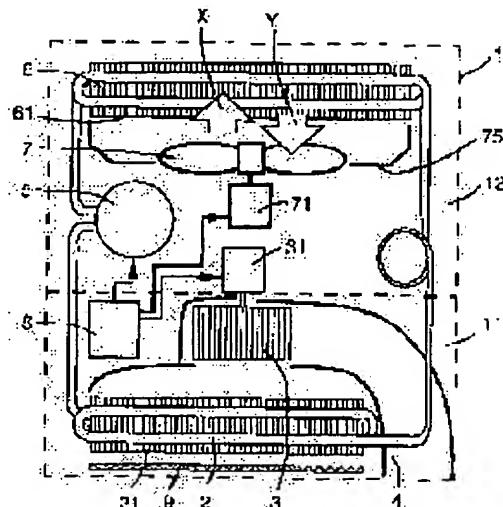
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(22)Date of filing : 24.06.1996 (72)Inventor : KO KOUSAN

(S4) SELF SCREEN DEVICE FOR AIR CONDITIONER OUTDOOR HEAT EXCHANGER

(57) Abstract:

PROBLEM TO BE SOLVED: To provide a self screen device for air conditioner outdoor heat exchanger capable of keeping cleanliness over a long period of time.

SOLUTION: A controller 8 is provided in an outdoor part 11 of an air conditioner body 1, and a fan propeller 7 of a heat exchanger 6 of the outside part 11 is rotated in a positive direction and the fan propeller 7 is properly reversed whereby dust and contamination adhering to the heat exchanger 6 are removed utilizing a reverse flow of air. A controller 8 rotates the fan propeller 7 positively or negatively at a predetermined set time, and it reverses the fan propeller 7 after a compressor 5 of the air conditioner is interrupted or at a predetermined set time where a load is lightened to keep the cleanliness of the heat exchanger 6 over a long period of time.



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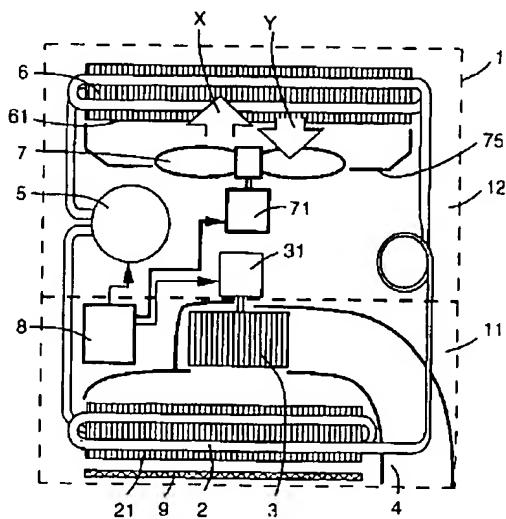
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(54)【発明の名称】 エアコン室外熱交換器セルクリーン装置

(57)【要約】

【課題】 清潔を長期間保つエアコン室外熱交換器セルクリーン装置を提供する。

【解決手段】 本発明のエアコン室外熱交換器セルクリーン装置は、エアコン本体1の室外部11の中に制御装置8を設け、室外部11の熱交換器6の送風プロペラ7を正方向に回すほかに、適時送風プロペラ7を反転させ、空気の逆流を利用し熱交換器6に付着した塵や汚れを除去する。制御装置8は送風プロペラ7を予め設定した時間に正方向および逆方向に回転させたり、送風プロペラ7をエアコンの圧縮機が停止した後あるいは負荷が軽くなった予め設定した時間に反転させ、熱交換器6の清潔を長期間保持する。



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【特許請求の範囲】

【請求項1】 室外熱交換器および送風プロペラを有するエアコンに制御装置を設け、送風プロペラを正方向に回す以外に、予め設定した時間に送風プロペラを反転させ、逆方向に流れる空気を利用して室外熱交換器上に付着した塵や汚れを除去することを特徴とするエアコン室外熱交換器セルフクリーン装置。

【請求項2】 前記制御装置は、送風プロペラを予め設定した時間に正方向および逆方向に交互に回すことと特徴とする請求項1記載のエアコン室外熱交換器セルフクリーン装置。

【請求項3】 前記制御装置は、送風プロペラをエアコン圧縮機の運転停止後、予め設定した時間に反転させることを特徴とする請求項1記載のエアコン室外熱交換器セルフクリーン装置。

【請求項4】 前記制御装置は、送風プロペラをエアコン圧縮機の負荷が軽くなった時に反転させることを特徴とする請求項1記載のエアコン室外熱交換器セルフクリーン装置。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、エアコン室外熱交換器セルフクリーン装置に関するものである。

【0002】

【従来の技術】一般的エアコンの構造は、圧縮機により冷媒を室内、室外熱交換器に連なるパイプライン中に送り込み循環させ、冷媒圧力と気相、液相の変化がそれぞれ室内、室外熱交換器において蒸発吸熱、凝縮放熱するのを制御、送風プロペラで熱交換器の隙間に風を吹き込み、冷気、熱気を送る。

【0003】

【発明が解決しようとする課題】室内熱交換器は、フィルターにより室内の循環する空気を済過し、簡単に清潔を保つことができる。しかし、室外熱交換器は送風プロペラが送り込む空気を直接受ける為、空気中の塵や汚れは室外熱交換器が空気の流れを受ける一面に付着する。それが累積し、徐々に室外熱交換器の隙間を塞ぎ、熱交換器の効果を下げたり、ひどい状況では完全に消失したりする。よって、エアコンは一年ないし二年に一度あるいはもっと早くサービスマンを呼び室外熱交換器を取り外し洗浄しなければならず、非常に手間がかかる。

【0004】

【課題を解決するための手段】上記課題を解決するために、本発明の請求項1のエアコン室外熱交換器セルフクリーン装置は、室外熱交換器および送風プロペラを有するエアコンに制御装置を設け、送風プロペラを正方向に回す以外に、予め設定した時間に送風プロペラを反転させ、逆方向に流れる空気を利用して室外熱交換器上に付着した塵や汚れを除去することを特徴とする。

【0005】本発明の請求項2記載のエアコン室外熱交

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換器セルフクリーン装置は、請求項1記載のエアコン室外熱交換器セルフクリーン装置であって、前記制御装置は、送風プロペラを予め設定した時間に正方向および逆方向に交互に回すことと特徴とする。本発明の請求項3記載のエアコン室外熱交換器セルフクリーン装置は、請求項1記載のエアコン室外熱交換器セルフクリーン装置であって、前記制御装置は、送風プロペラをエアコン圧縮機の運転停止後、予め設定した時間に反転させることを特徴とする。

10 【0006】本発明の請求項4記載のエアコン室外熱交換器セルフクリーン装置は、請求項1記載のエアコン室外熱交換器セルフクリーン装置であって、前記制御装置は、送風プロペラをエアコン圧縮機の負荷が軽くなった時に反転させることを特徴とする。

【0007】

【発明の実施の形態】以下、本発明の実施例を図面に基づいて説明する。図1に本発明の実施例を示す。エアコン1の本体は、室内部11と室外部12の二つが区切られ隣接している窓型エアコンのようなもの、室内部11と室外部12が離れている分離式エアコンのようなものを含む。室内部11に室内熱交換器2、送風プロペラ3および通風部4を設け、室外部には冷媒圧縮機5、室外熱交換器6および送風プロペラ7等部材を設ける。室内熱交換器2、冷媒圧縮機5と室外熱交換器6間はパイプラインで結ばれ、冷媒はその中を循環流動、冷媒圧力と気相、液相の変化により室外熱交換器6で放熱、室内熱交換器2で吸熱する。その後、送風プロペラ7、3によりヒーター用空気、クーラー用空気を送る。以上が一般的エアコンの原理である。熱交換器2および6の構造であるが、廻らしてある冷媒のパイプライン外側に平行する多くのアルミ片を差しこみ、空気が通過できる隙間を作り、パイプラインの冷たい空気や暖かい空気を流すようとする。空気が隙間を通過する抵抗力、静電気等の作用により、空気中の微粒の塵は徐々に熱交換器が風を受ける面21、61に付着するが、室内熱交換器2はフィルター9により室内の循環する空気を済過しているので、簡単に清潔を保つことができる。しかし、室外熱交換器6は直接送風プロペラ7が送る空気を受けるので、空気中の塵や汚れは室外熱交換器6の風を受ける面61に付着、累積、日が経つに連れ次第に室外熱交換器6の隙間は塞がれ、熱交換器の効果は低下し、最悪の場合完全に消失することになる。よって、一般的エアコンは一年もしくは二年あるいは更に早く室外熱交換器6を取り外し洗浄しなければならない。

40 【0008】本発明は初めて創られたエアコン室外熱交換器セルフクリーン装置である。エアコン1に、制御装置8を設け、室外熱交換器6の送風プロペラ7を正方向に回転させるほか、適時その送風プロペラ7を反転させ、逆流する空気を使い室外熱交換器6上に付着した塵や汚れを除去、室外熱交換器6の清潔を長期間保たせ

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る。

【0009】それをコントロールする為、室外の送風プロペラ7のモーター71と室内の送風プロペラ3のモーター31は独立させ、制御装置8によりそれぞれコントロールする。すなわち、制御装置8は未図示のユーザーインターフェースおよび未図示の温度感知器等の信号インプットにより適時圧縮機5、モーター31および71の動きを制御、必要な冷気を送り出す。これは、一般的エアコンと同様である。本発明は、制御装置8に更に機能を加え、送風プロペラのモーター71を適時に反転させ、その反転と正回転は予め設定した時間に交互に切り替わる、または、圧縮機5が停止した時（或いは負荷が軽くなった時）のみ予め設定した時間内に反転するという特徴を持つ。

【0010】詳細に説明すると、エアコンは冷氣を作る過程の中で、圧縮機5が働き、送風プロペラ7により室外熱交換器6中の冷媒の熱を動かさなければならない。室外熱交換器6と送風プロペラ7の間に空気の動きを一定にする仕切り板75があり、空気の出入りする方向を導くので、送風プロペラ7が正回転時、空気を室外熱交換器6方向、つまり図示したX方向に押し出し、送風プロペラ7が反転時、室外熱交換器6を通過、つまり図示したY方向に空気は動き放熱作用が生まれる。同時に室外熱交換器6の風を受ける面61上に付着している塵や汚れを吸い取る。これにより、送風プロペラ7の構造においては反転する時逆方向に送風する機能があるのみで、適時にモーター71の反転を制御でき、目的を達成できる。送風プロペラ7の正転、反転に同様の送風効率があるなら、制御装置8はモーター71が正、反転に交互に切り替わるのを制御できる。正、反転の時間は、例えば1時間に1回、正転1時間反転5分、或いは今回機械を運転させる際正転で次回は反転など、同時間または異なる比率に設定できる。一般に使用されている軸流式プロペラは反転の際逆方向に送風するが、プロペラ曲面の設計が原因で、反転時送風効率が比較的低くなる恐れがある。冷氣の効率に影響を与えないためにも、冷氣を出さない時に反転させ塵を取りができる。例えば、一般（非コンバーター式）の圧縮機を使用したエアコンは、その冷気が求める室温に達した時に圧縮機を停止させるようコントロールされており、この圧縮機が停止した時を利用して送風プロペラ7を反転させ、圧縮機が再度動いた時送風プロペラをまた正転させることができ。コンバーター式圧縮機を使用したエアコンでは、現在の室温と求める室温との差により圧縮機の回転速度を変えている為、圧縮機の負荷が軽い（低回転速度）時送風プロペラ7は反転し、圧縮機の負荷が重い（高回転速度）時送風プロペラは再び正転する。このほか、毎回エアコンが停止した後の時間に送風プロペラを3分間反転させた後停止し、塵や汚れを除去することもできる。

【0011】制御装置8と送風プロペラモーター71の 50

構造であるが、下の従来の技術から選択する。

（1）モーター71は交流分相永久蓄電式モーターを使用、電源の一端を固定子主コイルもしくは副コイルに連結することで、正転、反転に変換できる。

（2）モーター71は直流モーターを使用、二つの電源入力端を変えることで、正、反転させる。

【0012】（3）モーター71は三相交流モーターを使用、任意に二つの電源入力端を変えることで、正、反転させる。

10 （4）制御装置8は時間を計算する電気回路を含み、繼電器により必要時間に応じてモーターの配線を切り替え、モーターの正、反転をコントロールする。

（5）制御装置8はマイクロ処理機を含み、制御条件を設定それに応じ繼電器によりモーターの配線を切り替え、モーターの正、反転をコントロールする。

【0013】図2に一実施例の組立を示す。そのモーター71は交流分相永久蓄電式モーターであり、主コイルM1、三段速度調節H、M、Lを含む副コイルM2、コンデンサーC等により構成される。繼電器RLしが制御装置8のアウトプットした制御信号を受けて作動、電源ACの一端を主コイルM1もしくは副コイルM2に連結することで、正、反転が変わる。制御装置8はマイクロ処理機電気回路で、内部の制御ソフトにより、前述したように適時信号をアウトプットし、繼電器RLしおよびその他未図示の速度調節用繼電器が作動し、モーター71の回転方向および回転速度をコントロールする。

【0014】上述したモーター、時間を計算する電気回路およびマイクロ処理器制御設計はこの種の技術者がよく知るところであるから、贅言しないこととする。

30 【0015】

【発明の効果】以上説明したように、本発明のエアコン室外熱交換器セルフクリーン装置は、エアコン内部に制御装置を設け、室外熱交換器の送風プロペラを反転させる特徴をもつ。それにより、熱交換器上に付着した塵や汚れを除去、長期間清潔を保たせるのに効果的である。

【図面の簡単な説明】

【図1】本発明に関する実施例の断面図である。

【図2】本発明に関する制御装置と送風プロペラの一つの実施例の構造図である。

40 【符号の説明】

- | | |
|----|--------|
| 1 | エアコン本体 |
| 11 | 室内部 |
| 12 | 室外部 |
| 2 | 室内熱交換器 |
| 21 | 風を受ける面 |
| 3 | 送風プロペラ |
| 31 | モーター |
| 4 | 通風部 |
| 5 | 圧縮機 |
| 6 | 室外熱交換器 |

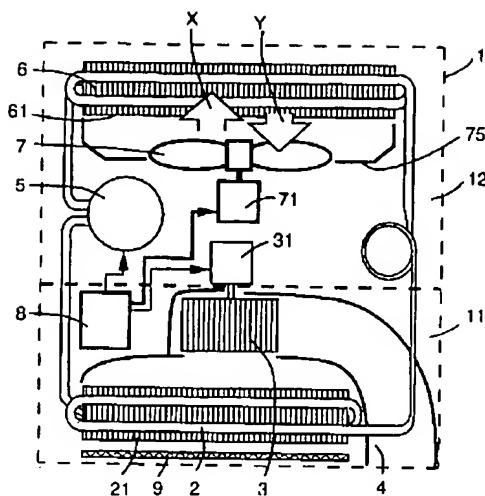
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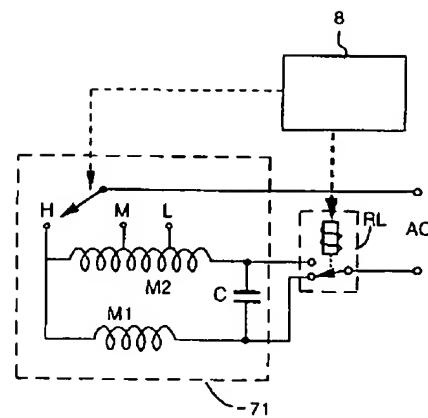
- 61 風を受ける面
 7 送風プロペラ
 71 モーター
 75 仕切り板
 8 制御装置
 AC 電源

- RL 緩電器
 C コンデンサー
 H, M, L 三段速度調節
 M1 主コイル
 M2 副コイル

【図1】



【図2】



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CLAIMS

[Claim(s)]

[Claim 1] Air-conditioner outdoor heat exchanger self clean equipment characterized by removing the dust which adhered on the outdoor heat exchanger using the air which form a control unit in the air-conditioner which has an outdoor heat exchanger and a ventilation propeller, and the time beforehand set up besides turning a ventilation propeller in the right direction is made to reverse a ventilation propeller, and flows to an opposite direction, and dirt.

[Claim 2] The aforementioned control unit is air-conditioner outdoor heat exchanger self clean equipment according to claim 1 characterized by turning a ventilation propeller to the right direction and an opposite direction by turns at the time set up beforehand.

[Claim 3] The aforementioned control unit is air-conditioner outdoor heat exchanger self clean equipment according to claim 1 characterized by making the time set up beforehand reverse a ventilation propeller after the shutdown of an air-conditioner compressor.

[Claim 4] The aforementioned control unit is air-conditioner outdoor heat exchanger self clean equipment according to claim 1 characterized by reversing a ventilation propeller when the load of an air-conditioner compressor becomes light.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to air-conditioner outdoor heat exchanger self clean equipment.

[0002]

[Description of the Prior Art] With a compressor, the structure of a common air-conditioner sends in a refrigerant into the pipeline who stands in a row in the interior of a room and an outdoor heat exchanger, and is circulated, and change of a refrigerant pressure, a gaseous phase, and the liquid phase blows a wind into the crevice between heat exchangers for an evaporation endothermic and carrying out condensation thermolysis with control and a ventilation propeller in the interior of a room and an outdoor heat exchanger, respectively, and sends cold and heat.

[0003]

[Problem(s) to be Solved by the Invention] An indoor heat exchanger can filter the air through which the interior of a room circulates with a filter, and can keep cleanliness easy. However, in order that an outdoor heat exchanger may receive directly the air which a ventilation propeller sends in, the dust and dirt in air adhere to the whole surface in which an outdoor heat exchanger receives the flow of air. It accumulates and the crevice between outdoor heat exchangers is taken up gradually, and the effect of a heat exchanger is lowered or it disappears completely in a severe situation. Therefore, an air-conditioner must call a serviceman once or more early in one year or 2, must remove and wash an outdoor heat exchanger, and requires time and effort very much.

[0004]

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, the air-conditioner outdoor heat exchanger self clean equipment of the claim 1 of this invention forms a control unit in the air-conditioner which has an outdoor heat exchanger and a ventilation propeller, and the time beforehand set up besides turning a ventilation propeller in the right direction is made to reverse a ventilation propeller, and it is characterized by removing the dust which adhered on the outdoor heat exchanger using the air which flows to an opposite direction, and dirt.

[0005] The air-conditioner outdoor heat exchanger self clean equipment of this invention according to claim 2 is air-conditioner outdoor heat exchanger self clean equipment according to claim 1, and the aforementioned control unit is characterized by turning to the right direction and an opposite direction by turns at the time which set up the ventilation propeller beforehand. The air-conditioner outdoor heat exchanger self clean equipment of this invention according to claim 3 is air-conditioner outdoor heat exchanger self clean equipment according to claim 1, and the aforementioned control unit is characterized by making the time beforehand set up after the shutdown of an air-conditioner compressor reverse a ventilation propeller.

[0006] The air-conditioner outdoor heat exchanger self clean equipment of this invention according to claim 4 is air-conditioner outdoor heat exchanger self clean equipment according to claim 1, and the aforementioned control unit is characterized by reversing a ventilation propeller, when the load of an air-conditioner compressor becomes light.

[0007]

[Embodiments of the Invention] Hereafter, the example of this invention is explained based on a drawing. The example of this invention is shown in drawing 1. The main part of an air-conditioner 1 contains a thing like the aperture type air-conditioner which two, the interior 11 of loculus and the loculus exterior 12, are divided, and adjoins, and a thing like the separation formula air-conditioner from which are separated of the interior 11 of loculus, and the loculus exterior 12. The indoor heat exchanger 2, the ventilation propeller 3, and the ventilation section 4 are formed in the interior 11 of loculus, and the refrigerant compressor 5, an outdoor heat exchanger 6, and a ventilation propeller 7 grade member are prepared in the loculus exterior. It is connected with a pipeline between the indoor heat exchanger 2, and the refrigerant compressor 5 and an outdoor heat exchanger 6, and a refrigerant carries out the endothermic of the inside of it to circulation and a refrigerant pressure with thermolysis and the indoor heat exchanger 2 by the outdoor heat exchanger 6 by change of a gaseous phase and the liquid phase. Then, the air for heaters and the air for air conditioners are sent with the ventilation propellers 7 and 3. The above is the principle of a common air-conditioner. Although it is the structure of heat exchangers 2 and 6, many pieces of aluminum which are parallel to the pipeline outside of the plotted refrigerant are inserted, the crevice through which air can pass is made, and a pipeline's cold air and warm air are passed. Although the dust of the minute amount in air adheres to the fields 21 and 61 where a heat exchanger receives a wind gradually by operation of a resistance force, static electricity, etc. with which air passes through a crevice, since the indoor heat exchanger 2 is filtering the air through which the interior of a room circulates with a filter 9, it can keep

cleanliness easy. However, since an outdoor heat exchanger 6 receives the air which the direct ventilation propeller 7 sends, adhesion, accumulation, and a day take the dust and dirt in air to the field 61 which receives the wind of an outdoor heat exchanger 6 passing, the crevice between outdoor heat exchangers 6 is taken up gradually, and the effect of a heat exchanger falls, and when the worst, it will disappear completely. therefore, a common air-conditioner -- one year or two years -- or you have to remove and wash an outdoor heat exchanger 6 early further

[0008] this invention is ***** air-conditioner outdoor heat exchanger self clean equipment for the first time. Form a control unit 8 in an air-conditioner 1, and it is made to rotate the ventilation propeller 7 of an outdoor heat exchanger 6 in the right direction, and also the ventilation propeller 7 is reversed timely and the cleanliness of removal and an outdoor heat exchanger 6 is maintained for the dust and dirt which adhered on the outdoor heat exchanger 6 using the air which flows backwards for a long period of time.

[0009] In order to control each, the motor 71 of the outdoor ventilation propeller 7 and the motor 31 of the indoor ventilation propeller 3 are made to become independent, and are controlled with a control unit 8, respectively. That is, a control unit 8 sends out control and required cold for the movement of a compressor 5 and motors 31 and 71 timely by signal inputs, such as a non-illustrated user interface and a non-illustrated temperature sensor. This is the same as that of a common air-conditioner. this invention adds a function to a control unit 8 further, it changes to the time when timely was reversed at and the reversal and right rotation set up the motor 71 of a ventilation propeller beforehand by turns, or only when a compressor 5 stops, it has the feature that it is reversed within the time set up beforehand (or when a load becomes light).

[0010] If it explains in detail, in the process which makes cold, a compressor 5 must work and an air-conditioner must move the heat of the refrigerant in an outdoor heat exchanger 6 with the ventilation propeller 7. since the direction where there is a diaphragm 75 which makes movement of air regularity, and air goes in and out between an outdoor heat exchanger 6 and the ventilation propeller 7 is drawn -- a ventilation propeller 7 -- the time of right rotation -- air -- an outdoor heat exchanger -- it gets blocked, it extrudes in the illustrated direction of X six direction, air moves in the direction of Y in which the ventilation propeller 7 passed, and got for it blocked and illustrated the outdoor heat exchanger 6 at the time of reversal, and it is born in a The dust and dirt which have adhered on the field 61 which receives the wind of an outdoor heat exchanger 6 simultaneously are sucked up. Thereby, when reversed in the structure of the ventilation propeller 7, it is only that there is a function which ventilates an opposite direction, and reversal of a motor 71 can be controlled to timely and the purpose can be attained. An oak with the same ventilation efficiency as normal rotation of the ventilation propeller 7 and reversal and a control unit 8 can control that a motor 71 changes to positive and reversal by turns. In case the time of positive and reversal makes a machine operate once normal rotation

~~1 time-reversal 5 minutes or, and this time in 1 hour, reversal etc. can be set as this time or a different ratio by normal rotation next time.~~ Although the axial flow formula propeller currently generally used ventilates an opposite direction in the case of reversal, the design of a propeller curved surface is the cause and there is a possibility that ventilation efficiency may become comparatively low at the time of reversal. In order not to affect the efficiency of cold, when not taking out cold, it can be made reversed and dust can be taken. For example, the air-conditioner which used the compressor [being general (non-converter formula)] is controlled to stop a compressor, when the room temperature which the cold searches for is reached, the ventilation propeller 7 is reversed using the time of this compressor stopping, and when a compressor moves again, a ventilation propeller can be rotated normally again. By the air-conditioner which used the converter formula compressor, since the rotational speed of a compressor is changed according to the difference of the present room temperature and the room temperature to search for, it is reversed, and when the load of a compressor is light (low rotational speed), the ventilation propeller 7 rotates a ventilation propeller normally again, when the load of a compressor is heavy (high rotational speed). In addition, it can stop, after making the time after an air-conditioner stops each time reverse a ventilation propeller for 3 minutes, and dust and dirt can also be removed.

[0011] Although it is the structure of a control unit 8 and the ventilation propeller motor 71, it chooses from a lower Prior art.

(1) A motor 71 is connecting the end of use and a power supply with a stator main coil or a subcoil, and can change an alternating-component phase permanent accumulation-of-electricity formula motor into normal rotation and reversal.

(2) a motor 71 changes use and two power supply input edges for a DC motor -- it is -- positive -- make it reversed

[0012] (3) a motor 71 -- a three-phase-alternating-current motor -- use and changing two power supply input edges arbitrarily -- it is -- positive -- make it reversed

(4) Including the electrical circuit which calculates time, a control unit 8 changes wiring of a motor according to required time with a relay, and controls positive [of a motor], and reversal.

(5) a control unit 8 -- a micro processing machine -- containing -- a control condition -- a setup -- change wiring of a motor with a relay according to it, and control positive [of a motor], and reversal

[0013] The assembly of one example is shown in drawing 2 . The motor 71 is an alternating-component phase permanent accumulation-of-electricity formula motor, and is constituted by the subcoil M2, Capacitor C, etc. including the main-coil M 1 or 3-step speed regulation H, M, and L. Positive and reversal change because Relay RL connects the end of an operation and a power supply AC with a main coil M1 or the subcoil M2 in response to the control signal which the control unit 8 outputted. A control unit 8 is a micro processing machine electrical circuit, and with internal control software, as mentioned above, a signal is outputted timely, Relay RL and the relay for speed regulation non-illustrated [other] operate, and it controls the hand of cut and rotational speed of a motor 71.

[0014] Since this kind of engineer is just going to know the motor mentioned above, the electrical circuit which calculates time, and a micro treater control design well, suppose that they are not ****(ed).

[0015]

[Effect of the Invention] As explained above, the air-conditioner outdoor heat exchanger self clean equipment of this invention forms a control unit in the interior of an air-conditioner, and has the feature which reverses the ventilation propeller of an outdoor heat exchanger. It is effective for maintaining cleanliness for the dust which adhered on the heat exchanger, or dirt by that cause removal and for a long period of time.

[Translation done.]